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## IN MODERN THOUGHT

### 7th Summer Workshop

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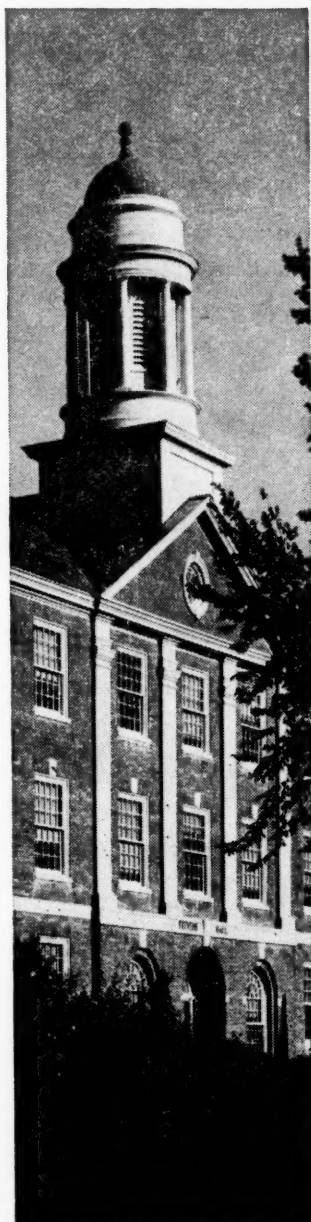
**Dates:**

Sunday, June 28 through  
Thursday, July 2

**Place:**

University of Maine, Orono  
(near Bangor), Maine

The central theme will be the  
nature of creativity in science,  
and its significance for the cul-  
tural linking of the sciences  
with the humanities.



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# MAIN CURRENTS IN MODERN THOUGHT

*A co-operative journal to promote the free association of those working toward the integration of all knowledge through the study of the whole of things, Nature, Man, and Society, assuming the universe to be one, dependable, intelligible, harmonious.*



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"Ah, but a man's reach should exceed his grasp, or what's a heaven for?" — BROWNING

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2. To assist teachers to understand and use such materials, and to develop an active, realistic, comprehensive philosophy which will communicate to their students the unity, coherence, and beauty of the world in which we live.

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# THE DEDUCTIVE METHOD IN THE PHYSICAL SCIENCES\*

Henry Margenau

Yale University

## 1. *The Present Crisis*

The political and cultural maladjustments of our time are subjects of common knowledge and cause for universal concern. No less serious, however, is the cultural crisis that confronts mankind. It is manifest in divisive ideologies, in fragmentation of intellectual disciplines, and in the excessive specialization of scientific research. A dichotomy has developed, not only between the arts or the humanities, on the one hand, and the sciences on the other; but even within the sciences there seems to be condensing a curtain between the so-called physical disciplines and the social disciplines. Many believe that the method of the physical sciences is totally different from that employed in the social sciences, that it is this difference in method which accounts for the tremendous success of the former and the relatively slow progress of social institutions. Watchful scholars in both camps are asking: What is the main-spring for success in the physical sciences? Are their methods wholly unique, or are they transferable to other fields, particularly the field of human affairs? All these questions raise the important problem of methodology.

Concern for basic method is new in the United States. An all pervading pragmatic spirit has kept our scientists busy with immediately profitable tasks. Interest in philosophy on the part of scientists has been frowned upon in view of the patent fact that it has kept some scientists from doing their best work. We had to achieve results, and the less said about the way in which they were attained the better. For is it not true that a bird can fly without knowing the principles of aerodynamics? If a bumblebee studied the design of aircraft he would never venture to entrust himself to the air, for he would know that his ratio of wing surface to body weight is far too small for sustained flight.

All this is true—and it is good advice for birds and bumblebees. But suppose the art of flying is to be transferred from birds to men. When man wanted to fly he had to study aerodynamics.

\*This is the author's digest of a paper which was published in the April, 1953, issue of *Electrical Engineering*.

Its Contemporary Essential Role

And Position in Other Fields

Watching the birds was not sufficient for this task. A conscious effort was required to study the phenomenon of flight and to formulate the laws which regulate them. And so it would seem to be if the method of the physical sciences is to be made useful for an understanding of human behavior. More must be known of these methods than their mere use in the physical sciences demands. The physicist, the chemist, the astronomer must become reflective and ponder the meaning and the foundation of his own discipline. The present paper indulges in such reflections.

## 2. *Science as Inductive Quest for Useful Knowledge*

Physical science is sometimes regarded as a great mass of inductive activity. And inductive activity is understood to be the enterprise of carefully collecting, comparing, sifting, and cataloguing facts with a zeal and an honesty characteristic of the scientific worker. This limited view, however, ignores some of the theoretical elements which are always present within true scientific understanding. It underestimates the use of reason as well as the illuminating connections which this faculty provides among facts inductively discovered. If science were nothing more than induction, it would merely move from discovery to collation and tabulation, ending with a statement of regularities gleaned by an inspection of tabulated facts; scientific knowledge would be a surface texture of incidental observations loosely joined and devoid of the solid ground of logical coherence into which the roots of the facts always extend. The view which regards science as merely an inductive undertaking in the Baconian sense is one-sided, limited, and incapable of generalization. Unfortunately it is quite common in the social field and may be in part responsible for the separation between the science of nature and that of society.

## 3. *Correlational vs. Theoretical Science*

If we survey the entire domain of scholarly endeavor which is called science, we can roughly distinguish two large areas, one which will be called for want of a better name, correlational science, and another to be called theoretical science.

The distinction is not clear cut; there are many disciplines which fall partly in one and partly in the other of these two categories. By correlational science is meant one which remains largely on the primary ground of observed facts, which describes, orders and judges these facts, exhausts itself in establishing correlations between them. Researchers in these fields often pride themselves upon their independence of theories, which to them are odious things that ought to be avoided. They draw inferences from their observed facts and announce their conclusions with probability, spurning the certainty which flows from the basic theoretic understanding they deem to be illusory.

The theoretical scientist on the other hand links observed facts with certain theoretical notions of which he is not ashamed, and these notions, or ideas, or constructs take on greater and greater reality and importance as they enter into more extensive connections with observed facts. Modern physics is a theoretical science, as indeed it must be, for it deals with many unobservable entities on the atomic scale. Our knowledge of electrons springs largely from abstract principles which are not obtained altogether by induction but are nevertheless checked in a more indirect way against the facts of observation. Among the sciences which are largely theoretical, and therefore called exact, are applied mathematics, physics, astronomy, and much of chemistry. Correlational sciences are botany, zoology, large parts of sociology and medicine as well as of engineering. Some sciences might be said to be intermediate between these two classes. These include psychology, genetics, and economics.

The distinction just drawn is a time-bound one, and describes merely a given stage of a science. The history of science shows that some branches of it passed through a naturalistic stage, in which they were descriptive, i.e., correlational. This stage is then followed by a theoretic one. Physics, for instance, was correlational in the days of Aristotle and attained exact or deductive status in Galileo's and Newton's day. Biology is in the process of transition at the present time. It may well be that all correlational sciences are on the way toward becoming theoretic in the end. This is a conjecture which can obviously not be proved. To clarify the meaning of the distinction we have made, it is well to study in some more detail the process of deduction.

#### 4. *The Process of Deduction*

To reason deductively means to draw conclusions from premises, not from incidental facts. The simplest example of the deductive process is the syllogism, typified by the time-honored example, "All men are mortal, Socrates is a man, therefore Socrates is mortal." To use a more modern version, every arithmetical operation leading to a computed result is a deduction, the conclusion being already implied in the postulates constituting the meaning of number. More interesting perhaps

is the kind of deduction often employed in modern electrical engineering. Here one starts, for example, with Maxwell's equations, uses them together with boundary conditions to compute the modes of electromagnetic waves which can be transmitted by wave guides. By purely mathematical operations, predictions can be made with respect to actual occurrences, and the labor involved in making these predictions is often far less than the work of direct experimentation. On many occasions, of course, such a deductive process is not available. There exists no general principle which can, for example, guide the engineer in a search for materials having specified properties. When deductive methods are available they are usually time-saving, always powerful and elegant.

There was a time when the use of deductive method in science was under suspicion, and we are still suffering from the effects of this attitude. Naturally, deduction must start with premises and the conclusions drawn are never truer than the premises themselves. But where do we get the premises and who vouches for their truth? Philosophers of the rationalist school have held them to be self-evident, have called them axioms, and the term axiom carried with it an assurance of indubitability. It was thought at one time that the postulates of Euclidean geometry were axioms of indubitable truth and that the consequences following from them must be equally valid. This conviction received a rude shock, however, when the existence and plausibility of non-Euclidean geometry was discovered during the middle of the last century. What seemed at one time absolutely certain was now not only drawn into question but actually proved to be false. This experience and many others recorded in the history of science constitute an indictment of the absolute truth of premises and has brought to the deductive method a measure of disrepute. Scientists have felt that, if the premises are never certain, the conclusions are not interesting at all and have therefore rejected all rationalistic elements in science.

The lesson with respect to the fallibility of premises used in deductions is an important one and must always be remembered. But the process of deduction is not tied to infallible premises. The premises, axioms, or postulates which it does employ can be regarded, and are regarded in all proper applications, as *tentatively* true. Their value does not lie in our being certain about them, but in our being able to derive from them specific consequences which can be tested against experience. The verification of these observational experiences reflects back on the certainty of the premises, and when there are sufficiently many instances of verification the premises are said to be "true." It is in this way that our faith in Maxwell's equations has grown to a complete acceptance of this theoretical formalism. Let it be noted that Maxwell's equations cannot be derived from experimental facts, no matter how numerous they are.



They imply more than any finite body of experimental information, and herein lies their power.

### 5. *The Method of Theoretical Science*

The method of theoretical science is an interplay between induction and deduction. Postulates are suggested by experimental facts and experimental facts are in turn deduced from postulates. These postulates, although not *a priori true*, gain stature and validity as the process of experimental verification succeeds.<sup>1</sup>

### 6. *Operational versus Constitutive Definition*

The dual aspect of scientific method here introduced has an important bearing on the problem of definitions in science. These must be of two kinds, one called operational, and the other constitutive. An operational definition provides an access to theoretical constructs from the domain of observational facts; the constitutive definition connects theoretical constructs by logical rules and mathematical relations among themselves.<sup>2</sup> A scientific quantity which is only operationally defined is devoid of logical implications and permits no reasoning about it, a quantity which has only a constitutive definition is experimentally sterile and leads to nothing more than speculation.

<sup>1</sup> For a detailed discussion of this interplay, see *The Nature of Concepts; Their Inter-Relation and Role in Social Structure*, Proc. of the Stillwater Conference of the Foundation for Integrated Education at Oklahoma A. and M. College, 1950.

<sup>2</sup> For illustrations of these two types of definitions, see Henry Margenau, *The Nature of Physical Reality*, McGraw-Hill, 1950.

"What are some of the things we must do to lift administrative leadership from the level of schoolkeeping to that of educational statesmanship? First, we must develop a philosophy of administrative leadership. One's philosophy of administration will derive from many sources. It will depend on one's conception as to the nature of the society in which we are living. It will be possible merely to illustrate some of the items or issues involved in forming one's viewpoints in dealing with this problem. They may be briefly stated in the form of questions: (a) Is ours a dynamic, developing, and as yet imperfect society, or is it a relatively static, largely perfected society? (b) Should such changes as come about in our culture and institutions in the decades just ahead be the result of the force of circumstances and forced by circumstances, or should they be the result of scientific social analysis and attempts to direct the course of social development toward relatively definite goals? (c) How seriously are the stability and orderly and democratic development of America threatened by unsolved problems of our contemporary society? (d) Is the role of the United States in the world scene now significantly different from that of 1900, and what

### 7. *The Adequacy of the Method of Theoretical Science to Human Affairs*

We return to the problem raised in the beginning. Scientific method, to be applicable and to be successful in the field of human affairs, must emphasize equally both poles, induction as well as deduction. It is not to be expected that the present overemphasis on the inductive will lead to successes in the human field comparable to those in the physical sciences, which do emphasize both aspects of method in balanced fashion. It is often asserted that the description of social interactions will never be scientific in the sense of physics. This view allegedly gains plausibility from two circumstances: One, the complexity of social phenomena, which is supposed to be far greater than that in the physical world, and two, the reputed impossibility of isolating variables. Neither of these destroys the applicability of scientific method in its fullness to social science. As to the complexity, physical science also showed a welter of unrelated and confusing facts before the light of deductive method shone through its structure. The second argument, which claims that a measurement in the social sciences interferes very strongly with the situation to be measured, can be refuted by pointing to the modern quantum theory of physics, which does in fact provide a deductive formalism dealing with the situation in which the interaction between an observation and the physical system to be observed is extreme.

are some of the elements in that role?

"Again, one's position concerning school administration depends on his conceptions of the role of the school, and of education in general, to the society of which it is a part. Here again we can merely give a few illustrations of issues on which one needs a viewpoint. These issues, again, will be stated in the form of questions: (a) Are the functions of the school largely custodial and conserving in nature, or does it also have a role to play in anticipating and advancing the evolution of our society? (b) Should the content and spirit of education be looked upon as relatively timeless and permanent, or does it derive from the nature and spirit of the society of which it is a part? (c) Should education operate in relative isolation as it affects the main currents of social development, or should it be closely intertwined with these currents and involve close contact with the largest possible number of citizens?"

—John K. Norton, Teachers College, Columbia University, in "Emerging Demands on Administrative Leadership in Education" from *School and Society*, Vol. 72, No. 1880, pp. 433-4

# PALEONTOLOGICAL ERAS\*

John Imbrie

Columbia University

Basic Concepts, New Questions

In the History of Life

I am pleased to have this opportunity to participate in the work of the Foundation for Integrated Education, because as a geologist and paleontologist I have a particular feeling for the necessity of integration. Naturally I see this need particularly in geology and related fields. In the universities we tend to observe one another across academic fences, and to maintain an unwholesome degree of compartmentation. Even within the field of geology it is difficult enough to get one geologist to integrate his work with that of another, and the greater task of relating geology to biology or chemistry or philosophy lies almost entirely ahead of us.

The purpose of this report is to bring before you what I consider to be some of the basic concepts and questions in paleontology, that portion of geology which deals with ancient organisms. In order to do this we will need some understanding of a subject of perennial interest: the age of the earth.

It is extremely interesting to trace the evolution of ideas about the age of the earth. I shall not attempt to go back so far as the early Hindus and Egyptians, although they were not lacking in speculations, but I should like to recreate the point of view of the Elizabethan era, which survives for us vividly in the writings of Shakespeare. In *As You Like It*, Rosalind has an importunate suitor who threatens to die for love of her. Rosalind, however, is not very sympathetic, and says, in effect, that the earth is 6,000 years old, and in all that time no man has ever really died of love — thus giving us in a word the Shakespearian idea of the age of the earth. About fifty years later, in 1654, a biblical scholar in the University of Cambridge, named John Lightfoot, drew a rather elaborate series of calculations based upon biblical genealogy, and in so doing arrived at a figure for the age of the earth. According to Mr. Lightfoot, "Heaven and earth, center and circumference, were made in the same instance of time, and clouds full

of water and man were created . . . on the 26th of October, 4004 B.C., at 9 o'clock in the morning."

Whatever one might think of Mr. Lightfoot's conclusions, it must be admitted that he was extremely precise. These estimates may amuse us today, but in fact they had a very adverse effect on the history of geology and geological concepts. You may judge the extent of this effect by contrasting Lightfoot's figure with the present-day estimate of the age of the earth, which is, at a minimum, two billion years. In other words, his estimate was about 300 thousand times too small. Let us see how an error of similar magnitude would affect our understanding of something smaller and more familiar. The major part of the history of the city of Philadelphia took place within a span of 300 years, from 1650 to 1950, during which time the city evolved from a tiny hamlet into a large, thriving cultural and business center. If for some reason we erred in this estimate, and believed that the number of years involved in this period of accomplishment was 300 thousand times less than the actual 300 years, what would be the result? We would have to believe that the whole development of Philadelphia took place in 1/1000 years, or nine hours! I leave you to judge what fantastic notions would result. In exactly the same way, the Elizabethans who believed that the earth was only 6,000 years old could not achieve a sensible interpretation of the earth's history.

To return to our historical survey, geologists began soon to recognize that the earth must be older than 6,000 years. Unfortunately this figure of Mr. Lightfoot became inserted as a reference in the margin of the King James version of the Bible. Thus for a long while it was dangerous to believe otherwise, and for a still longer period it was considered unorthodox if not irreligious. Geologists nevertheless soon began to revise their estimates upward. They knew that the earth was older than 6,000 years — but how much older? One of the earliest scientific attempts to arrive at a figure was made by Lord Kelvin, the famous

\*This paper is taken from a lecture given in the Philadelphia Course, "The Frontier of Knowledge," sponsored by the Foundation for Integrated Education.

British physicist. In 1872, in an address before the Royal Society in England, he estimated the earth to be between 20 to 40 million years old. That estimate was based on certain assumptions concerning the rate of cooling of our planet. Interestingly enough, Charles Darwin, the famous biologist, was present on this occasion, and he objected that 20 to 40 million years would not allow enough time for organic evolution. To this Lord Kelvin retorted that his estimate had been mathematically proven. Lord Kelvin's mathematics were indeed correct enough; the error lay in his original assumptions, and time has justified Mr. Darwin.

Another famous investigation was originated about the year 1720 by an English scientist named Halley. He had the idea that if the amount of salt in the ocean could be calculated, and also the amount of salt contributed by the rivers of the earth every year, it would be possible to discover the age of the ocean (and through it, the age of the earth) simply by dividing the total amount of salt in the ocean by the annual increment. By 1899 enough data had been accumulated to permit Jolly to make the calculation. The resultant figure was about 90 million years. Geologists recognized that this could only be a minimum figure, because it is probable that more salt is being contributed today by the rivers than was the average in the geologic past. Moreover, some of the salt reaching the oceans does not remain in solution.

At this stage, the sister science of physics came to our rescue, providing a classic illustration of the fruitful results of the integrated approach. Our greatest progress in the past 50 years has been achieved in those borderline areas which lie between geology and physics, between geology and chemistry, between geology and biology. As soon as knowledge of radioactivity became widespread, physicists suggested that radioactive minerals could be used to give us an idea of the age of the earth. In the last fifty years, this method has become the standard of geologic chronology.

The outline of the theory is quite simple. Certain radioactive elements, such as uranium, break down or disintegrate at a known rate, producing lead as a stable end product. Thus the ratio between the amount of the radioactive element and the lead varies in a calculable manner through time. We can measure this ratio in a mineral crystal and calculate its age. Although the laboratory work is not easy, hundreds of analyses have been made. I shall mention one of these because it represents one of the oldest known rocks on the crust of the earth. In an area around Rice Lake in the Canadian province of Manitoba, some rocks containing several different radioactive elements have been analyzed. Within a known experimental limit of error, all of the figures agree that these rocks are about two billion years old. That is certainly a vast span of time, hard to

comprehend, yet I must emphasize again that this figure represents only a minimum estimate for the age of the earth. The earth must be considerably older than this — how much older we do not know.

During that immense span of time, the earth has undergone an extraordinarily complex geological history. The North American continent, for example, has been subjected to mountain making and invasions of the ocean many times, and myriads of plant and animal species have arisen, evolved, and died. Because the record is so long and so complicated, geologists have felt impelled to subdivide this enormous span of time — to provide chapters in geologic history, so that the book of the earth might be more easily read.

In our daily lives we find it convenient not only to subdivide time, but to make the subdivisions coincide with naturally recurring events. In exactly the same way it would be an advantage for geologists to recognize chapters in earth history which would be based on naturally recurring geologic events. One of the constant themes of geological research has been to demonstrate such a natural periodicity. An early attempt at fixing such natural subdivisions was made between the years 1800 and 1850, largely in England but also on the continent. At that time evidence was found that some important geologic events occurred periodically, namely, the upheaval and birth of large mountain systems, like the Alps and the Appalachians. Geologists believed that they had found good evidence that at the time a mountain chain was born in Wales (for example), others were being formed at widely separated localities. This provided an excellent theoretical basis for subdividing earth history into eras and periods, the boundaries of each being determined by such large and important geologic events as the birth of mountain chains. Furthermore, the rocks representing these periods of time were found to contain different kinds of fossils.

When Darwin published his classical work in 1859, the idea quickly took hold that these mountain making epochs that ended each geologic period must have been critical ones for the animals and plants on the earth and in the oceans, resulting in widespread evolution and extinction. The reasoning was somewhat like this: If a large mountain chain like the Sierra Nevada is raised up, it affects the atmospheric circulation, the climate of adjacent areas, the relative proportions of land and sea, and the currents of the ocean. Many animals that could not evolve quickly enough to meet changes in the environment would die out, while others would undergo rapid evolution to new types. The net result would be that in our fossil record we could perceive a grand reflection of the changes in the structure of the earth's crust.

This was a highly satisfactory theory, and the only unfortunate thing about it is that it has been rendered improbable by newer observations.



Paramount among these is the disturbing discovery that a number of mountain ranges were formed at times which did not fit into the existing schedule of mountain building. As a result, most geologists today have abandoned the theory that periods of widespread mountain-making are simultaneous. Nevertheless, so that we might keep some semblance of order, we have retained these geologic periods as convenient subdivisions of earth history. Some geologists believe that the periods are reflections of periodic inundations of the continents by the seas. Others feel that they are strictly arbitrary in their scope. We do not have in our hands today conclusive evidence, and these questions must remain as inspiring tasks for future research.

Students of fossils have another approach to the problem, for through their hands pass the tangible record of biological activity during the last 500 million years. Such questions as these are foremost in the minds of many paleontologists today: Are there times in the earth's long history when for some reason a great many animals and plants became extinct, and other times when many animals evolved unusually rapidly? Is there, in short, a pulse in the evolution of animal and plant life? If so, does it in some way correlate with physical events such as the formation of mountain ranges, or times of aridity, or glaciation?

The problem is easy to frame, but it is not as simple to solve. One approach is through a quantitative analysis of the fossil record. This means looking over and tabulating our vast and cumbersome literature in order to make a quantitative measure of the diversity of life at successive periods of geologic history, as it has been reported by paleontologists working during the past two centuries. With these data in hand, we could objectively answer the question: Are there times marked by widespread extinction and widespread rapid evolutionary development? I cannot bring you a final answer, because this is the present battleground of our research. All I can do is to bring to your attention one or two of the recent results of these analyses of the fossil record which appear to me to be significant and provocative.

A recent analysis (Sloss, 1950) traces individual major groups of marine animals through their fossil record, counting the number of genera or species that lived in any particular time. Now it is common knowledge that the history of many fossil groups shows a minimum diversity near the time of their inception, increases to a maximum, and tapers off gradually to extinction. The data of Sloss seem to show that for the groups studied, the curve obtained by plotting numbers of species (or genera) against time is amazingly symmetrical, approximating, in fact, the normal curve. Why should this pattern be so symmetrical? Can comparable results be obtained in other groups? These questions cannot now be answered. Such inter-

pretations are of course very disturbing to anyone believing that a large scale environmental change must affect the evolution of a single group of organisms. Apparently this is not the case, or at least the physical and biological factors are so complex that we have not been able to unravel them so far.

A second group of students has set for itself the problem of analyzing, not merely individual groups of marine animals, but the totality of fossil life in all its diversity. With regard to marine life as a whole, we find that there have been times when unusually large numbers of extinctions took place. In one of the periods in our history which we call the Permian (after exposures of rocks in the province of Perm in Russia), we find almost wholesale extinctions. Such a real crisis in the history of life has only occurred once or twice on a large scale. Why should it occur at all? One hypothesis assumes that lowering of the sea level would crowd the marine animals in the narrow continental margins, and so be responsible for widespread extinctions. This explanation, however, does not account for extinctions of land animals at the same period. Thus the problem has no ready solution.

In addition to times of widespread extinction, there have also been several times when most major groups of marine animals went through a rapid and dramatic increase in the speed of their evolution, as measured in numbers of genera originating per million years. Can these times of rapid diversification be explained by relating them to particular events in the physical history of the earth? The majority of modern paleontologists would probably hold that such a correlation cannot be made. A far more likely explanation can be framed in biological terms, with times of widespread extinction being followed by rapid diversification of the organisms taking over the vacated habitats.

### Summary

An appreciation of the length of geologic time is important for geologists. It also affects biologists, for evolutionary theories would mean little if we were not able to place them in some vast time scale, represented by our figure of two billion years as a minimum figure for the age of the earth. Geology contributes to our basic cultural orientation by giving us a sense of time, in the same way that astronomy gives us a sense of space.

Geologists have found it necessary to subdivide the long and complex history of the earth into periods. These subdivisions may prove to be natural or arbitrary units. Analysis of the fossil record indicates that there is a rhythm in the evolution of life, with times of rapid evolution and times of wholesale extinction. Students of fossils thus have their fingers on the pulse of life itself, a pulse whose beats punctuate the immensity of geologic time.



# THE PROPER OBJECT OF PSYCHOLOGY\*

## AN OUTLINE

Maximilian Beck

### I

#### 1. *Psyche is not consciousness.*

Sigmund Freud has shown that our physical life, to a great extent, passes unconsciously. Could such unconscious life be described in terms of consciousness? But to speak of an *unconscious* consciousness, attributing thereby unconsciousness to consciousness, is self-contradictory; it is like speaking of a wooden iron. And to explain the unconsciousness of physical phenomena by *repression* implies a suppressing factor which cannot be conscious itself. Thus fear and shame are not identical with the consciousness they try to repress nor are they themselves mere forms of consciousness. On the ground of Freud's theory at least two kinds of repression have to be distinguished, namely, the repression of consciousness and the repression of factual desires whose factual existence is hidden from consciousness and whose repression causes the pathological phenomena. The rich field of Freud's discoveries calls for a theory which postulates the realm of psychical phenomena as essentially unconscious in themselves, though intermittently related to body and consciousness.

The second argument for the essential difference of psyche and consciousness is the fact that the various kinds of psychical life cannot be defined as specifications of consciousness itself. Consciousness in its purity is plain awareness. But there is no sense in considering fear, desire, anxiety, joy, expectation, grief, pride, will, hope as specifications

The Science of Psyche and Soul,

Not of Consciousness or Bodily Behavior

of awareness. To fear, to will, to desire, and so on, obviously are not kinds of awareness although we can fear, desire, will and, in addition to these our psychical conditions, be aware, that is, conscious of them. But as Freud has proved, it is not necessary that we are conscious of them. In other words, psychical acts are not different kinds of consciousness itself but possible objects or contents of consciousness.

Besides, awareness is by its very nature objective; psychical acts, however, are essentially subjective. By this we mean: The subject of awareness is the knower, spirit or mind whose very nature it is to be aware of objects as they are — and nothing else. The subject of psychical acts is the ego which is essentially partial, ego-centric, not objective, not "detached."

Furthermore, recent philosophy has put, at the center of psychological investigations, the concept of *intentionality*. Franz Brentano, reintroducing this old scholastic term, understood by it the psychical act in which we relate the inner contents of our consciousness to something beyond it as to the *object* of consciousness. . . . Brentano's disciple, Edmund Husserl, gave the theory of his teacher another turn by changing the meaning of the term transcendence, used by Brentano for the object intended, from a reality beyond consciousness to an immanent character of consciousness itself. . . .

But consciousness is not intentionality; it is awareness. Husserl himself cannot do without awareness. For the immediacy with which any sense-datum or content is "given" to the intentional acts, which are supposed to enliven them with meaning, is already givenness to consciousness. Husserl presupposes these contents, which he calls *hyle*, that is, matter or material as pre-given to the forming function of intentionality. Pre-given — by what? Pre-given — to what? By and to consciousness in the sense of awareness. And as to the intentional acts themselves, how can we get knowledge of them unless by awareness? Mere identity of the knowing and the known is blind. Such an interpretation would be just as naive as the ancient thesis that equal can be recognized by equal. And to think, as Husserl implies, that the continuity of being — in retention — can explain

\*Ed. Note: This article is reprinted from the March, 1953, issue of *Philosophy and Phenomenological Research*. Three sections have been omitted from the original article: an elaboration of the work of Edmund Husserl, a section on principles of psychological classification, and a section on psychological types and laws. As space considerations did not permit publication of the entire article, these sections were considered to be of less concern to MAIN CURRENTS readers.

The following paragraph was written by Mrs. Ann Beck: "A few months before his death, in April 1950, my husband had planned to submit this paper to *Philosophy and Phenomenological Research*. Due to unexpected circumstances, the paper, though fully completed and corrected in manuscript form, could not be typed in time to be presented to the editors before Dr. Beck's death. The article has been edited by Dr. Herbert Spiegelberg of Lawrence College and Miss Jeremy Ingalls of Rockford College. Dr. Spiegelberg assisted me in clarifying the philosophical meaning in a number of places by suggesting changes in wording. Miss Ingalls has gone over the paper for style and idiomatic expression. The content of the paper, however, has not been altered in any way."

anything is not a finding of phenomenological research but metaphysical dogmatism. Neither has a self-identical stone self-consciousness, nor has a continuous stream of water knowledge of its continuous parts as connected by immediate continuity. Husserl is obviously influenced by Bergson. But Bergson's arguments are analogies and metaphors like the one of the thread in his *Introduction to Metaphysics*: They do not explain or prove anything.

While Husserl's identification of intentionality with consciousness is mistaken,<sup>2</sup> his concept of intentionality, nevertheless, has proved very helpful in establishing recent psychology as the science of *inner attitudes*. We shall see that these attitudes are intentional acts. Proving that intentionality is not consciousness is proving that psyche is not consciousness.

There is still another confusion of psyche and consciousness based on the old fallacy which is alive in epistemological idealism and which Ralph Barton Perry has called the *egocentric* predicament. Its reasoning is expressed in the question: How can there be any sense in attributing to the contents of consciousness any existence apart from and beyond consciousness itself, if it is impossible to obtain any knowledge of them or to verify them — without appealing to consciousness? Such a question implies that it would make sense to assert a reality apart from and beyond consciousness only if it were possible to know it without knowing it. Obviously, we can have consciousness of something only while having consciousness of it. The egocentric predicament expresses precisely this tautology.

Now psychological phenomena are not exempted from the self-evident truth that every verification is verification by and for consciousness. But this is completely different from the statement that psychological phenomena *are* nothing but consciousness.

A basic error, which has to be mentioned in this connection, is the confusion of image with consciousness. Even a mountain dreamed or only imaged is not consciousness but, as a mountain, it is an object of consciousness. Here we are confronted with a problem of ontology and not of theory of knowledge. This is a new problem. For just as perspectives are not subjective products of consciousness but have an objective status of their own, so the objects of dream and imagination also are objects of a special kind. What kind of reality they have has still to be asked. However, it cannot be assumed from the outset that they are nothing merely because they fall outside the frame of the coherent world in which we live while we are awake.

<sup>2</sup> In the second chapter of my *Psychologie* (German edition, 1938, Leiden, Netherlands, A. W. Sijthoff; Spanish translation 1947, Buenos Aires, Editorial Losada), I refuted in greater detail Husserl's definition of consciousness as intentionality.

## 2. Psyche is not bodily behavior.

We do not know "naked souls" or any psyche which is not located in an animal body, nor do we get knowledge of psychical phenomena beyond ourselves except by bodily expressions. Yet it cannot be denied that bodily events in nerves, brain, glands, in the circulatory, digestive, and respiratory system influence psychical phenomena or at least are definitely correlated to them. Drink coffee or alcohol and your psychical condition changes considerably. Similarly our entire psychical condition changes due to the physiology of our sex glands. Our psychical mood changes immediately when we step out of a room with stale air into the fresh air of the open country. Smoking a cigarette helps to concentrate our thinking. Innumerable facts of this kind cannot be denied. Do they prove that psychical phenomena are nothing but those bodily events which condition or accompany them? They do not even prove the necessity of the connection of definite psychical phenomena with these bodily conditions or correlates. I can be "drunk" without wine and I can be alert and concentrated in my thinking without coffee and cigarettes. And I can even have pains without any bodily cause, as in hysterical attacks. Recent psychiatry has destroyed the conviction that every mental illness must have its specific cause in an injury or anomaly of the brain or the nervous system. Kurt Goldstein has proved empirically that there are not even irreplaceable strict correlations between brain events and physical functions. But even if a strict necessity of correlation and causal connection between psyche and body should exist, this would not prove the identity of both. The effect is *not* the cause, and correlated phenomena are not identical phenomena.

Modern behaviorism is one victim of this modern *reductionism*. To say B, the effect, is nothing but A, the cause, is simply nonsense. And it is equally nonsense to say of two parallel lines that they are one line. Furthermore, modern behaviorism is the victim of the prejudice that *all* science has to be natural science, expressible in exact number and measure, demonstrable and communicable by experiment. Everyone, even behaviorists, know by experience psychical phenomena like the ego, will-power, thinking, hate and love, envy, and the like. But they dismiss these immediate psychical experiences as mysterious inventions of philosophy or of pre-scientific naiveté and replace them by the bodily events to which these psychical phenomena proper seem to stand in a necessary connection. They believe they are on solid scientific ground if they speak of physiology instead of psychology. On the physiological level they are very articulate and talkative. But we find the real psychological knowledge in the books of the great poets, historians, moralists, in memoirs and letters of practical psychologists such as diplomats and politicians. To the old Greeks the diaphragm or

the heart was the seat of the soul; to the old Hebrews it was the blood! But I would exchange the psychological knowledge of the entire behavioristic literature for one page of the psychological knowledge of Thucydides or of the Bible.

The most decisive reason for the substitution of physiological phenomena for psychological ones in the attempt to describe and define the latter is the narrowness of the behavioristic concept of reality. Compelled and accustomed — in the interest of our bodily life — to focus our attention almost exclusively on the external, that is, physical or material world, we have come to call real only what we can touch, see, feel with our sense organs. It needs education and training to notice and to acknowledge immaterial realities. It is necessary to state that the ability to see immaterial objects has deteriorated immensely in our age. Modern man, fascinated by material progress, has lost interest in everything that cannot be moved by means of a physical lever; he does not see any reason to look for something else. Accordingly, the wide field of immaterial entities has become to modern man an accumulation of fancies invented by superstition; he calls them "supernatural" and ridicules them. Everything that does not fit into the narrow materialistic perspective of modern man is arrogantly denied existence. Although an object may offer itself to genuine experience most intrusively and convincingly, it is nevertheless dismissed as "supernatural" in the sense of not existing at all. The method used for the denial of objects of most immediate and convincing reality is the method of reduction. Its formula is "A is nothing but B." To my ears this sin against the first law of logic sounds just as ridiculous as the magic formulae of the darkest ages. It is a shame that modern scientists, so proud of reason, are not aware of such a tremendous blunder.

## II

### *Psyche and living beings are contrasted with physical things*

We said that psyche is neither consciousness nor a bodily event. It is more difficult to show positively what psyche is. However, this can be done, first, by contrasting it with physical things.

(a) The most striking difference is that all physical things are extended in space, while it would be absurd to attribute to a psychical phenomenon any spatial extension, though it makes sense to attribute temporal duration to them. Joy, will, thinking, pride, despair, hope, and the like are not so and so many inches or fractions of an inch long or broad or high. Nor could we attribute to them particular geometrical forms.

(b) The second difference is that psychical phenomena have no sensuous qualities: they are not colored nor do they sound or taste or smell; and when we speak of light or dark psychical phenomena, or hard or soft, hot or cold ones, we speak *metaphorically*.

In this context we have to mention that sense data are essentially properties of physical things. To assign sense data a place in the field of psychology is the result of an obsolete philosophy, which found no other way of explaining illusions and some physical and physiological facts than to interpret subjectivity as arbitrariness and perspective data as psychical reactions to external stimuli. Recent phenomenological research is more cautious and on the track of an explanation which is much more in agreement with real experience and common sense. But philosophy which tried to build up the entire psychical reality as a mosaic of sense data almost inevitably blinded the science of psychology to the radical heterogeneity of physical and psychical phenomena.

(c) The third striking difference between physical and psychical phenomena is that all physical phenomena are essentially connected with a thing which appears in its qualities while all psychical phenomena are related to an *ego* which manifests itself in the psychical phenomena as their acting subject.

Here, again, a digression is necessary. To speak of an ego as a subject and of a thing as a substance is considered to be outdated in our dynamic age. But this opinion is due only to a misunderstanding of concepts that are basic to philosophical tradition. Substance and subject do not mean persistent carriers of changing attributes and hypothetical static somethings behind the flux of real experience. They are not invention of mere speculation; they are matters of experience and of reason. Of reason: for there is no sense in speaking of absolute flux and change — of nothing. Similarly, there is no sense in speaking of absolute motion, function and relation — except in connection with a something that moves, functions, and is related. Likewise there is no sense in speaking of activity without some one who acts, or of knowledge without a knower, or of love without a lover, or of will without some one who wills, and so on. Plato knew Heraclitus's dissolution of all rigid permanence into mere flux very well. So did Aristotle. But neither they nor their followers during the Middle Ages understood by substance what the English empiricists made out of it, namely, a kind of permanent stuff underlying all changes of its properties. Only this completely corrupted sense of the term substance has been repudiated by modern science; but not Plato's concept of static essences nor Aristotle's and his followers' concept of substance, whose highest type of perfection is not material substance but form and action, *actus purus*.

The dissolution by theory of the physical thing and the psychical subject or ego, into a special combination and structure or into a continuous and coherent flux of parts contradicts experience. Thing and ego have this in common that, as iden-



tical quiddities or essences, they permeate all their different properties. They are neither names for the total of their parts nor mere patterns of combination, not merely forms or categories in contrast with their parts as their material contents. No, they are contents, quiddities themselves which, as identities, appear and manifest or express themselves in all the various parts, elements and stages of their actualization. A piece of wood, in its natural color, does not only look wooden but it also sounds and smells so, and it has the specific weight, resistance, elasticity of wood. The same specific stuff-essence manifests itself throughout all the various qualities of specific materials. Gold cannot sound wooden or look blue. We hear the essence gold, and we see it and we feel it while touching or weighing it: it is always the same essence, gold. The thing is an object of a specific essence and not simply a form or objectivation of consciousness.<sup>3</sup>

Equally the uniqueness of an ego penetrates as identical essence all its various expressions. The identity of the ego is not an illusion due to the continuity or fringe-character of the psychical stream. A unique ego, as the same quidditive essence, is present in all its various acts. It precedes its acts as their source and is contained totally in each of them; it is not sum total or a combination of them.

So far a physical thing and a psychical subject — an ego — have this in common: in both cases logic and experience contradict their dissolution, by modern dynamic thinking, into mere illusions. Thing and ego *are*.

But apart from that, physical and psychical reality are absolutely different. First, things are dead; psychical subjects live. It is life that brings psychical subjects into one group together with plants. Both are living beings. What does this mean? There are many characteristics of life.

(1) Living beings are organisms; that is, all their parts are interconnected; they condition each other mutually in their existence.

(2) Living beings grow; that is, they develop spontaneously out of a potential status into actuality. The seed or germ of a living being is potentially what the grown-up being is actually. And it has been proved experimentally that this growth is not simply an increase in magnitude and an unfolding of microscopically small parts already actually in existence in the seed. Nevertheless, this germ shows a strong determination: A plum can never develop into an apple tree but only into another plum tree. And the egg of a sea-urchin cut in two halves and kept alive in isolation does not develop into two halves of an adult sea-urchin

but into two adult sea-urchins completely developed though of smaller size than usual. There is something non-material in living beings which directs the process of their growth toward ends exactly predetermined. Potentiality, though nothing material, is nevertheless not non-existent.

(3) Life is cyclical. It moves from the seed to rebirth in the fruit as seed again. It does not move toward senility and death. Senility and death are not essential characteristics of life but signify its defeat by physical powers. Nietzsche calls these powers the "spirit of heaviness" (*Geist der Schwere*); it is the antagonist of the rapidly-flying, of the *dancing life*. Senility and death prevail where life ceases to maintain itself. It is not even self-evident that all bodily life must die. Such an assertion would not even be based on facts. There are trees which are thousands of years old. And there are colonies of lower animals which do not die. And even in us the genes of our ancestors still live. It is not *a priori* impossible that modern science, turning its main interest from physics to biology, will find the particular cause of senility and death and the remedy against them and will thus prove practically that senility and death are not essential to life. Essential, however, is the cycle from birth to birth, that is, from the seed out of which a living being originates to the seed of its fruit. But here a qualification is necessary. The cycle of life and rebirth applies only to the genus and the species. By this we mean that this cycle does not apply to the life of man as an individual.

(4) This cycle of life finds its analogue in the self-reflectedness of life. In the seed of the fruit the living being as type comes back to itself. This recurrence is a kind of getting hold of itself. But this is exactly what a basic phenomenon of life implies, namely *sensation* — in which case this term means, however, the immediate, *unconscious having* of one's own body or its parts. I can perceive my own body from the outside, as one physical thing beside other physical things, just as I see or touch or feel or hear the bodies of other living beings. But I can *have* only my own body immediately, namely in the shape of a *sensation*. This immediate having a hold of itself in a living being, as it were, from the inside, is different from any cognitive perception. It is not due to consciousness or awareness. I have my own body constantly in this immediate way. But only sometimes, mostly in cases of a physiological disorder, do I also become aware of it, in addition to that immediate sensation, namely, in the form of becoming conscious of pain, or in the case of a restitution or order, of physical pleasure. Physical pain and pleasure are, in themselves, not psychical phenomena. The pain of a toothache or hunger and the intense pleasure of the satisfaction of food hunger or sex hunger are localized in definite parts of my body; they are essentially of the body. Be-

<sup>3</sup> I am indebted for these observations to my teacher Alexander Pfänder. They represent one of his principal arguments against Husserl's conception of a transcendental object.



coming aware of pain or pleasure I can, at the same time, feel psychical joy or sorrow because of them. We have reason to believe that not only men and animals but plants, too, "have" their own body in sensations; that is, are self-reflected. But we are sure that physical things, stones for instance, do not have sensations, are not self-reflected. Why not? This leads us to another characteristic of living beings, and the fundamental one.

(5) The essence or nature of living beings, their quiddity or whatness is dynamic. We have to distinguish what a being is, that is, its nature or essence, from its actual existence, its idea from its reality.<sup>4</sup> All of essences are elemental, even if, as substantial forms, they seem to consist of essential parts. The essence triangle is not the sum of three sides and three angles, but is an elemental *gestalt*. Nevertheless, we can distinguish, within the elemental *gestalt* triangle, three sides and three angles as essential parts. Now some substantial essences, like the triangle, have parts which do not exclude each other in time; the three sides and three angles are simultaneous parts of the triangle. All essences of mathematical things are of this kind; they are static. Other essences, however, like those of living beings, have aspects within their essence which preclude their simultaneous occurrence. It belongs to the nature of essence of living beings to grow, that is, to pass through stages such as infancy, childhood, adolescence, maturity. These stages essentially exclude each other in time. I do not speak now of the *fact* that a living being cannot, at the same time, be embryo, child, adolescent, and adult; I speak of the *essential* nature of living beings, which precedes their actualization. When I think of a tree, I understand, from the outset, that a tree by its very nature needs time to develop its potentialities successively. Furthermore, since a living being is essentially an organism, the whole and its parts condition each other. And every part is potentially the whole and the whole is in every part. These are characteristics which constitute the quiddity, the what, the content of a living being. The actualization of this essence of a living being follows its essence. And so does the fact of successive growth. The exclusion of simultaneous existence as the quiddity or content of the essence of every living being, I call dynamic, dynamism being its intrinsic character. This is the root of a tension between that whole which a living being is, potentially, as essence, and all the partial actualizations of that whole while it actually lives or grows. The substantial essence of a living being is, so to speak, the implicative totality of all the parts and stages which it explicates while actually growing. It is impossible for a living being to actualize itself completely in any moment or part. So it reaches out, in each part and stage, toward its completion:

<sup>4</sup> Consult my paper on "Reason and Existence," *Journal of Philosophy*, Vol. XLIV (1947), pp. 375-80.

it strives, it drives, it is under tension. Life is pressure, impulse, urge, impetus which can never achieve satisfaction and rest. It is so by essential necessity.

The living being is the *subject* of life. Its being-the-subject-of-life does not mean that it has hold of itself as a knowing being in its particular acts of self-realization. Nor does its self-realization mean that it achieves knowledge of itself. It means only that out of this living being its partial actualizations radiate in such a way as to be directed back to the living being as their end. Thereby it has hold of itself, namely, in its sensations.

### III

#### *The Essence of Psyche is the Uniqueness or All-relatedness of the Ego*

In plants we can study living being in its simplest form. Animals and men are living beings, too. But they have, in addition to their vegetative life, also a psychical life; and men, beyond that, a spiritual life. The psychical life has, in common with the vegetative life, a subject which is not the knower, and the self-reflection or having-itself-rooted in a dynamic essence. It "has" itself in feeling, which is again not a matter of consciousness but of a tension between the potential whole of the subject and its actualizations, which are essentially always only partial. The psychical subject feels joy whenever its urge for self-realization is fulfilled; it feels sorrow or grief when it is frustrated. But apart from this, the psychical life is essentially different from vegetative life. The reason is that the psychic subject is an ego, characterized by its uniqueness. The uniqueness of the ego is a phenomenon *a priori*. That means that no ego has the slightest doubt about the absolute impossibility of the existence, somewhere and sometime, of an exact double of itself that it has not yet experienced. The ego is essentially unique. And this could not be the case if its uniqueness consisted only in the fact that it was an extremely richly, fully determined instance. For the fully determined instance does not preclude a multiplicity of instances of the same kind.<sup>5</sup>

Uniqueness is all-relatedness by all-differentiation. Something of this phenomenon is recognized in the form of universal causal relatedness. We know that a single change here and now presupposes and entails a change in the entire cosmos. For everything is, at least indirectly, connected with everything else by the chain of cosmic causal-

<sup>5</sup> It is a funny experience to see oneself unexpectedly in a mirror without realizing that the room has a wall filled by a mirror. Whenever this has occurred to me, I have been startled by the familiarity of the person before me. But as long as I took the phenomenon as real, it never occurred to me that this person could be a double of myself; yet I was embarrassed not to know the name of this very familiar person. Once, out of politeness, I even greeted the person in the mirror by a slight nod. Not until then did I realize that it was my own reflected image which I had greeted.

ity. It is this fact which has put before every philosopher the problem of how freedom is possible in this universe of inescapable and absolute determination. Without this all-controlling connection there would not be the unity of *one* world but rather many worlds.

Now, what is accepted as common knowledge in the form of the universal nexus of cause and effect is less well seen and understood in the more radical and basic case of beings whose essence it is to reflect the entire cosmos in themselves in perspective representation. The entire cosmos is objectively everywhere in perspective appearances. The perspective appearance is not an arbitrary product of consciousness. Whoever is in a particular position has an objectively determined perspective of the universe. The real mountain is where it is, but its perspective is smaller at a distance of three hours than at a distance of one hour and bigger than at a distance of five hours. This is not due to the particular nature of our eyes, nerves, and brain, but to the objective laws of perspective. And so the distance, whether close or far, of one being from every other is objectively determined as unique within the entire cosmos.

But there is not only spatial and temporal relatedness and perspective; there is also a relatedness and perspective according to quiddities and qualities. There is an inner logic in the cosmic order of essences apart from and preceding their factual relatedness to each other. And there is a particular kind of dynamic essences, similar to the essences of plants, comprising in an elemental *gestalt* potentially all the various moments of everything into which they can develop in actual life. But the elements of psychical life are not the parts and stages of a vegetative organism; they are *acts* in which the psychical living being or subject, the ego, acts toward the universe according to this predetermined logical order. According to this order, the ego has its unique relationship to everything in the universe. It thus mirrors in itself the entire universe. It is the microcosmic reflection of the macrocosm.

At this point we are reminded of the theory of Leibnitz: that the ego is windowless, that is, it has no consciousness of anything outside itself. Nevertheless, it acts appropriately toward everything outside of itself according to what Leibnitz called the preestablished harmony between itself and the entire cosmos. It represents potentially or by implication the sum total of all the actions possible toward it according to its unique position in the logical and factual order within the universe. The actual explication of its potentialities forms the psychical life of the ego. And since it can actualize only very few of those potential ways of conduct in any definite moment, it is always in tension toward their total; it is insatiable urge. The ego is essentially, by virtue of its uniqueness, all-related. Its all-relatedness is self-assertion by uni-

versal opposition. As Fichte explained it: The ego is what it is — An *Ich* (an I or Ego) — by opposition to the entire universe as to the *Nichts* (*Nicht-ich*), the nothing. It wants, of itself, to be actually everything. It is Will-to-power, as Nietzsche expressed it. Nietzsche expressed this demonic absolutistic nature of the ego most pregnantly with the words: "If God should exist — how could I stand it not to be God myself!" It is too cheap to dismiss such a pronouncement as plain craziness. In fact it is only the expression of the true nature of the ego as radically or essentially evil. The best psychologists have held the same pessimistic view. The difference between St. Paul's, St. Augustine's, and even Kant's view on the one hand, and Nietzsche's view on the other, consists in their opposite evaluation: Nietzsche prizes what the others radically condemn: the bestial nature in man. But this difference in evaluation does not disprove the evaluated fact itself.

#### IV

##### *All Psychical Acts are Attitudes*

The commonly accepted classification of psychical phenomena distinguishes cognitive, emotional, and conative phenomena. But we are lost with this classification whenever we try to subsume under it concrete psychical phenomena. Besides, cognition is a matter of consciousness<sup>6</sup> and, therefore, not psychical. The term *emotion* or *feeling* has become completely vague, since it is used for everything that does not fit into the other two classes. Finally, in modern psychology the term "conation" comprises phenomena so far apart and incompatible with each other as impulse, striving, and liking on the one hand, and will on the other hand. Even a merely illusive correctness of this classification can be maintained only by a crude theoretical distortion and misinterpretation of the psychical phenomena.

We propose to abandon the division into cognitive, emotional, and conative acts, and instead to define all psychical phenomena equally as inner attitudes of the ego. We indicated before, when we mentioned Husserl's concept of intentionality, what this term means. If intentionality is not consciousness, what else can it be? Precisely the various parts by virtue of the essential uniqueness of

<sup>6</sup> The very words for the acts which figure under the class *cognitive* imply blindness in themselves though always in combination with consciousness. This becomes manifest already in terms like *perceiving* or *comprehending*, which mean the *attitudes* of capture or taking hold. The objects of "cognitive" acts are not given by these acts but are presupposed as already there. In the "cognitive" acts, considered as psychical acts, we take possession of them by carving them out for the psychical individual. As contents they are already there for the omnipresent spirit, but the so-called cognitive acts carve them out for us as parts of the total of the universe.

Or consider terms like attention, retention, recollection, assertion, maintaining, assuring, presupposing, concluding and the words corresponding to them in other languages: these words mean literally particular attitudes or inner activities, not plain knowing, or specifications of consciousness.

the ego as microcosm. It does not know the various cosmic contents toward which it acts; but it contains them within itself, not in conscious immanence, but in its essence, that is to say, in its being-what-it-is, its uniqueness, its all-relatedness and all-differentiation. The easiest way to see what constitutes an inner attitude is to start with psychological phenomena whose attitude-character is so unmistakable that it is almost identified with its expression in a bodily posture. Take, for instance, *pride*: an erect pose of the body, with legs spread widely, and the arms akimbo. Though this bodily posture marks only the expression of pride, pride itself is something almost identical with it; it is in an inner way what that posture is in an external way.

If one has seen the inner attitude in the case of pride and of its opposite, humbleness, then one may look for it in other psychical acts which are not so obviously characterized as attitudes, such as, obstinacy, hostility and benevolence, envy, wrath, hate and love, grief and sadness, attention, perception, assertion, doubt, striving, and so on. One will always discover a dynamic stretching out, an intentional motion.

This behavior of the ego is not a bodily one, although it expresses itself frequently in bodily gestures and facial expressions and although it is frequently accompanied by particular bodily functions, such as changes in the circulation of the blood, in breathing, digestion, gland-secretion and the like. That psychical behavior and bodily behavior are not the same is proved by the fact that as a good actor one can fake psychical behavior by definite bodily behavior without psychically experiencing the slightest trace of what the bodily behavior pretends to express. And, apart from this, as we have already mentioned, all psychical phenomena present themselves as quidditively and qualitatively completely different from what the behavioristic school substitutes for them. On the other hand, the confusion of psychical and bodily events is understandable because of the difficulty of defining positively what psychical behavior is. If it is neither a matter of consciousness nor of the body, what else can it be? The dissipation, in recent physics, of matter into forms of energy has made some people see psyche as a form of physical energy. But, again, the heterogeneity of physical forces and psychical acts is obvious. To say that they are ultimately the same is metaphysical dilettantism. And to reduce psyche to physical energy as to its cause does even by that very formulation admit that both are different; for, as we already said, the effect is not identical with its cause; the shining sun is not the melting snow; flatulence is not headache, and both are not peevishness.

There are three keys which enable us to gain access to the psychical realm. One has been mentioned already, namely, the uniqueness of the ego which cannot be explained except by its related-

ness to the universe, that is, as inner behavior or attitude toward it. The second key is the metaphorical language which we are using in characterizing the psychical realm. The third key is the physiognomical expression of psychical attitudes.

Both the metaphorical language and the physiognomical expression presuppose identical quiddities or essences which manifest themselves in different fields. Everyone understands immediately what we mean when we speak of a hot temper, or a sweet feeling, a bitter pain, a light heart, a depressive mood, or of open, fragile, delicate, volatile, empty, or tough persons. When we describe psychical phenomena, we mostly use words whose literal physical sense and whose origin from the specific fields of sense data is almost forgotten in the new context. More than that: many words for specific sense qualities transcend vastly their literal meaning. Take, for instance, sweetness: there are not only sweet tastes but also sweet smells, sweet colors, sweet melodies, sweet faces, and even sweet feelings. The usual explanations by association fail. And saying that to apply the word "sweet" beyond the field of sensuous taste is "merely metaphorical language" states a fact but does not offer an explanation. There must be a particular reason which supports the use of metaphorical language.

Certainly, there is a similarity between a sweet taste and a sweet fragrance or color or melody or face or feeling. But this, too, is only a factual statement which fails to offer an explanation. Different things when similar are so always in a definite respect. Here we are facing Plato's problem of the universal and also the necessity of the same solution. The idea or universal is that of the identical something which makes similarity and comparison of different beings possible. The metaphorical language is not an arbitrary play of human imagination, but it is based upon objective facts. Different things are similar as to a definite quiddity or quality (*tertium comparationis*). The application to our problem is this: The incredible poverty and inadequacy of our psychological textbooks is due mostly to the fact that the entire wealth of psychological reality, as it offers itself to our knowledge in immediate experience, is simply ignored because of its "merely metaphorical" character.

Read the novels, plays, memoirs and essays of real psychologists. They are all written in that metaphorical language. Therefore our "scientific" psychologists do not take them seriously, but consider them as a kind of poetry. Instead, our "scientists" try to press the psychical reality into a scheme which forces psyche into the so-called cognitive, emotional, and conative categories. These categories are like sieves which let the psychical substances escape and return nothing but void abstractions. Now we have to consider that the actualization of the same idea or form, that is, of the



universal essence, in such heterogeneous realms of reality as the physical and the psychical, will entail in the actualization of the same essence of a considerably different character, different not as to the essence itself, but as to the way of its actualization. This difference is due to the essential difference of the medium for its manifestation. We cannot expect that a psychically broad or thin soul has spatial extension, or that a sweet or bitter feeling is something one could taste with one's tongue, or that a heavy or massive or unbalanced character can be measured on a scale, or that a hard and cold hostility can be felt with one's hands. All these qualities cannot be perceived in the way you perceive sense data. Naturally not; for they are not properties of psychical things, but they are acts of the ego, attitudes of a non-material subject. They are definite modi of inner motion in which the ego acts or relates itself to the universe according to its essential all-relatedness, which, by virtue of its uniqueness, is the nature or essence of the ego. They constitute the ego, so to speak, as its stuff, not as static matter and properties but as dynamic character.

The third approach to the psychic reality is given us in facial expressions and gestures. Again, I should like to recommend the reading of the great classics of literary psychology to see how they communicate to us the richness of psychological experience. There cannot be any question about the fact that, for instance, Dostoevski succeeds in picturing extremely concrete psychological characters. But the astonishing thing is that he does so most frequently by telling us merely how a person looks and behaves, and what he does, speaks, and thinks. Most of the time psychological terms are not mentioned at all, not even in metaphorical language. Nevertheless, we see, not physical bodies, but naked souls, passions, vehement psychical disturbances.

Here we must insert that in describing inner events in human beings we cannot confine ourselves to the psychical reality alone; the bodily life as well as the human consciousness with its contents must be included in the total object to be described. This explains why both bodily sensation and thoughts belong to the inner world which the psychologist is trying to bring before our eyes. And only because it is the total human personality whom Dostoevski describes and because this total human person comprises body and consciousness, is it necessary to tell us also what Dostoevski's characters feel, sense, and think. But the main point is that he succeeds in giving us a concrete picture of the inner life of human beings including their psychical life, without using psychological terms. And especially interesting is the fact that it is possible to give an extraordinarily suggestive picture of psychical reality by describing the bodily appearance and the facial expressions and gestures of a psychical subject. Sometimes it is much more

important to Dostoevski to describe *how* a person speaks than *what* he speaks.<sup>7</sup>

How is it possible to give a very concrete description of the psyche by describing its external physiognomy and gestures? Another question, very similar, is this: How is psychological knowledge of other individuals possible? What we see genuinely seems to be nothing but the body, the physiognomy and the gestures of other men, sometimes very different from ourselves. Nevertheless, we recognize immediately their inner condition. We do not guess or infer the other ego and its inner acts by analogy from a certain correspondence within ourselves between the external appearance and internal events. We do not even see other people as mere bodies, but we see them from the outset as souls in unity with their bodies to whom we can say "*you*." The theoretical assumption that we see men genuinely only as bodies conflicts with our experience. Normally, when we look at other persons, our view penetrates the bodily appearance and aims at and terminates in their psychical ego itself. Unless this happens, other men appear to us merely as marionettes or puppets. And to a very great extent convincing and self-evident information of psychical types is available in the bodily appearance of other human beings. Even before a certain type of man as much as opens his mouth and before he does anything, we know already that he is brutal; another type can be recognized immediately as filled with inner tenderness. Surely, we may be mistaken, or the other person may be guilty of dissimulation or pretense. But these cases presuppose that there is true knowledge and genuine expression. Also dissimulation and pretense themselves are particular psychical attitudes, which come to be recognized as such.

Again the answer to these questions is that one and the same essence manifests itself in physical appearances and psychical attitudes — of course, in a very heterogeneous way, according to the heterogeneity of the media for these manifestations.

We can best study psychical attitudes in animals; the blindness of their behavior is an acknowledged fact indicated by the term "*instinct*." In men it is always difficult to decide where behavior is purely psychical and where consciousness enters as a motivating factor. . . .

And in man still another determining factor has to be considered, namely freedom through consciousness, or spirit. Psyche and spirit constitute the human person. The less spiritualized a man is, the easier it is to predict his behavior because it will be all the more typical. Only personalities have biographies, that is, lives in which unique and hence unpredictable decisions count.

<sup>7</sup> Read, for instance the introduction of the two principal figures in the first chapter of Dostoevski's *The Idiot*.



## THE COLLEGE AND THE COMMUNITY\*

Baker Brownell

Northwestern University

After more than thirty years of effort without general success, a minority of men in higher education are still trying to give body to the word "integration." They find the term set up ostensibly as the proud reward of intellectual life in college. It involves, it seems, the clear, whole globe of life where thought always is relevant to action; and emotion, drive, desire, deed, all are coherent with one another in a harmonious pattern. It is a Greek ideal, envisioned here for that segment of the educational program called the humanities, and a good deal is heard of organic balance, justice, temperance by students majoring in that field. But the classic symmetry of life still remains for the most part a plush-covered item of educational interest in our universities that is less a structural part of the system than a matter of interior decoration. Educators turn to it for commencement themes, and the so-called liberal arts and the humanities are sprayed with its sweet scent.

This promise of integration is offered as a lure to the young intellectual as he comes up from a little place in Kansas, a farm in Indiana, or a suburb of Salt Lake City, seeking the golden unity of life that he has glimpsed in his boyish readings of Plato or Thoreau. But what he finds is less often the liberal arts as practiced or the humanities as lived. He finds instead endless levels of subject matters divided sharply into little lots, fifty feet in width, with a jealous specialist on guard over each one. He finds the word "integration," it is true, waving there like a flag above each plot, but acquaintance with the situation reveals little more. The intellectual youth may work a little plot of learning or several of them one after another with initial zest, for isolated subject matter may have an interest and seemingly a promise of its own that can absorb him. But usually he discovers after going through a score or more of college courses that the intellectual integration of his life was more real before he came to college than after. Acquaintance with the situation shows the emptiness of the college pretense. To this pretense of integration in higher education a small group of men are trying to give content. They are trying to replace words by deeds.

\*Reprinted from Chapter XV, pp. 177-182 of *The College and the Community*, by Baker Brownell (Harpers, New York, 1952).

### Integration in Higher Education:

#### A Problem Now Generally Recognized

Their success, though not overwhelming, has been positive in some ways. That their efforts remain peripheral rather than central so far as the university is concerned is less their fault than the failure of administrative officers who do not sustain them. Though several of the new programs in integration have been initiated by college administrators, it still is true that administrators come and go, each one with a different notion. Each makes his gesture nowadays in behalf of integration, but each gesture is unlike the last and the administrator in any case usually has only immature ideas of a sustained effort in the area. He talks it over with a convenient and amiable professor; appoints a committee; works up a prospectus and gets it into the catalogue. That, educationally, is usually where the matter ends. The program may go on for a few years in charge of an available instructor until it becomes by the process of academic erosion indistinguishable from the rest of the curriculum. Or it may be dropped entirely following an administrative change.

A serious approach to the problem will involve, I think, more than a course or so, or a flurry of new names and new arrangements of old academic habits. It will involve a radical re-examination of educational methods, materials, objectives, and of training programs for members of the teaching staff. Some men in the universities know this. They are willing to undertake a thoroughgoing job. But they are few in number and are likely to be brushed aside in favor of "safer" men. Their work has value as experiment. It provides educational experience, but is perforce fragmentary. The work as a whole has not been done.

Two methods have been used in these approaches to the problem: a course, a series of courses, or an experimental unit of some sort may be built up from the beginning. Or second, a re-orientation of existing courses, interdepartmental courses, or the coordination of a group of courses may be undertaken. This latter may be called a college. In the concrete the work is likely to have elements of both methods with variations according to the situation and personalities in each case. Within the strict jealousies of departmentalized education one or the other of these methods is

almost inevitable if a start is made at all. Neither one escapes the conventional curricular pattern: the pigeonholes, grades, competition, and the segregation of knowledge.

Courses *de novo* in integration face the resistance of those faculty members who resent intrusion into their sacred groves. They see the ark defiled by the hands of the unanointed. They strike in priestly rage at those who do not recognize the rituals of approach and procedure. "Are not these men," they ask, "outsiders, untrained in the specialties of the field and beyond departmental control? Why should they not be smitten down when the academic order of precedence and departments is threatened by them?" This was the cause in part of the defeat of the experiment by Meiklejohn at Wisconsin, of the endless sabotage of the course in Contemporary Thought at Northwestern, of the deadly attack on the campus course at Iowa, and so on down the list.

There is, on the other hand, a measure of justice in some of these attacks. The instructor in a new course in integration may be inadequately trained for the job. He may have more enthusiasm than wisdom. He may slap together uncritically a basket of ideas and colorful facts plucked from the departments around him and present this attractive hodgepodge as a revolution in higher education. Or he may give only a succession of routine surveys and summaries of different fields of learning without interpretive correlation. Clearly both of these indicate poor training. To this the enemy may add that no man, not even an Aristotle, can be adequately trained for the job. This too in a measure is true.

It is true, however, only to the degree that the intellectual integration of modern life is itself impossible. This is a kind of defeatism often accepted tacitly by men in academic life. But it will hardly be accepted by the intellectual youth from Kansas or Kentucky. In face of indifference or cynicism in the university he will cling at least to the hypothesis of the integration of learning and guide his course accordingly. He senses perhaps more clearly than do his instructors that the intellectual life itself depends on it.

Beyond all this is the fact that a course in integration for college credit is an administrative monstrosity. It can be justified only by the emergency. The concept of integration is by nature antagonistic to the departmental system and to the rituals of grades, credits, courses, and degrees. To attempt the integration of learning within this mechanism is contradictory. In the long run it cannot be successful except through the elimination of this mechanism, and thus few in the university are willing to consider it. Nor is there opportunity in the curricular system of the university today for the training of teachers in the work. In few courses is the material treated with this in mind. There is little downright conviction of the need.

The other method toward integration within the curricular system also has its difficulties. The reorientation of existing courses or the creation of interdepartmental courses and colleges through fusion of existing agencies and instructional staffs has had only limited success. Because it stirs up less resistance in the faculty, however, this method has at present considerable vogue. Usually it results in a social studies survey, or a course in general science, or a summary of the humanities. Here certain correlations of method and subject matter within one or another of the three traditional fields may be described, but that is all. The basic problem, the problem of the impact of one general discipline on the other, the problem, for example, of the impact of science and its culture on our values and moral initiatives, of modern technology on the humanities, of industry on the community, is usually ignored. The underlying dilemmas of these times go unrecognized. A really philosophic *Weltanschauung* is not attained.

Another difficulty in these fusion courses is their incidental status in the careers of the instructional staff. The teacher of such a course is usually trained in one departmental discipline or the other. Except for a few courses here and there in philosophy he has no other opportunity for training. He feels that his future depends on advancement in a specialized field and he teaches the integration course as a job assignment to be taken good-naturedly while he still is young. But he leaves it when the demands of research and advanced courses grow more urgent. Rarely are men found who look to a career in the work and who have the training in philosophy and in the philosophical aspects of the sciences, the social sciences, and humanities to do it. The job requires breadth of learning, imagination, and educational evangelism. The university at present is hardly favorable to such development.

The work in process in educational integration is nevertheless positive, constructive, and often worth-while. In various ways and in an increasing number of colleges it has grown in importance during the last three decades. It has been elaborated experimentally in many directions. In most colleges at least a gesture in its behalf is being made.

Harvard at last has recognized the problem and tries to meet it not by one but by several methods. The establishment there of roving or nondepartmental professorships opens many significant possibilities. The Harvard report on general education had a salutary effect on other colleges which had not yet risked the step. The report is neither a long step nor a new one. As the late Joseph Kinsey Howard said, "It gives the impression that the boys don't want to 'rock the boat' too much." Still it serves its purpose. Integration in higher education at last has become a generally recognized problem.

## REVIEWS

Dean Edmund W. Sinnott is one of the most readable authors currently writing in the general field from the scientist's point of view. *Two Roads to Truth*, subtitled *A Basis for Unity Under the Great Tradition* (New York, 1953, Viking Press, 235 pp. and index of names), is therefore a volume which will bring the reader smoothly up to the frontier between the small area of experience which natural science has so far possessed and the vast region where organized knowledge gives way to other immediacies, and especially to the vistas of religion. It is proper that a geneticist should tell us where that no man's land, set up last century, now lies. It is fortunate the writer is deft and acceptable to both parties. Just because he is professionally a scientist, he will be widely read and with a warming of the heart.

But will this book do much actually to remove the barbed wire, and to redeem the waste land? One is forced to doubt this. The emphasis is all upon the West. We came upon no discussion of Hinduism, Buddhism, or Taoism. None of these forces or their personages appear in the index. Surely, they are of the Great Tradition and important parts of Truth? Furthermore there is no attempt to work out a common ground of knowledge between those religions that are noticed and science.

What we need to know is how the physical orders, the psychological orders, and the spiritual orders are related in terms science can accept. We need to know biology in order to be able to discuss immortal life.

The author, being the serene soul that he is, will forgive us if we suggest that his *Cell and Psyche*, a masterpiece of workmanship, gives us more solid advance along the way than does this volume. For it traces a part of that razor's edge between the two roads, the path common both to heart and head.

Emerson still has the right of it, in his essay on Worship:

"The religion which is to guide and fulfill the present and coming ages, whatever else it be, must be intellectual. The scientific mind must have a faith which is science. 'There are two things,' said Mahomet, 'which I abhor, the learned in his infidelities, and the fool in his devotions.' Our times are impatient of both, and specially of the last. Let us have nothing now which is not its own evidence. . . . There will be a new church founded on moral science, at first cold and naked, a babe in a manger again, the algebra and mathematics of ethical law, the church of men to come, without shawms, or psalter, or sackbut; but it will have heaven and earth for its beams and rafters; science for symbol and illustration; it will fast enough gather beauty, music, picture, poetry."

In *Character Building and Higher Education* (Macmillan, New York, 1953, 125 pages, \$2) Dr. Ordway Tead concerns himself with the problem of character education. This small volume comprises the twenty-fifth volume in the Kappa Delta Pi Lecture Series.

Early in the text, Dr. Tead states that the personal qualities for strength of character ". . . will be assumed only by conscious intention, by planning, and by conducting effective training measures with all possible deliberateness."

This places a burden of responsibility upon all educational institutions and educators, for the author explicitly disavows the possibility that education can be morally neutral.

In discussing elements in the problem confronting colleges Dr. Tead stresses the point that, in our present cultural climate, there appears to be an excessive urge among students for social and material success. This, he believes, is a characteristic of "the secular quality which in some measure dominates our society."

While Dr. Tead approves the legal separation of church and state, he wisely points out that current *scientism* ("that ultrascientific dogmatism which contends that all that is real in life is discoverable and determinable through scientific inquiry; that use of scientific methods will disclose all necessary truth; that what cannot be measured cannot be evaluated") "can and often does have disturbing if not negative influence upon the moral outlook of students." This attitude, this fear of taking a stand upon anything on the part of teachers prevents the exercise of the character-building aspects of good modern educational theory.

Dr. Tead's definition of character is beautifully astute and sensitive, and his chapter on the motivating of moral action stresses the relation of reflective judgment as a moral act to the conduct of education.

In getting down to cases on "policies and programs," the author stresses the character of the teacher and explores many specific ways in which they can implement the development of character.

Dr. Tead displays a balanced and fair point of view. To be religious, education need not indoctrinate in creeds, rituals, or sects. On the other hand, to attempt to keep hands off evaluational, spiritual, emotional, and moral matters in an effort to avoid religion results in throwing the baby out with the bath water. "Man cannot live by bread alone" and neither can man be reduced to the proportion of a digital calculator. Education must recognize this, if it is to be education for humans in the true sense.

While seeking to avoid offense to those who are strongly committed to one faith or church and to those who prefer no religion or faith at all, educational institutions are completely ignoring those who are indifferent to religion or whose religious experience has been neglected. By exposing them to nothing whatsoever in the neglected areas, the felony is compounded and the educational institutions have done nothing to stop their moral drift and have permitted them to remain in a position ". . . which at some point of crisis will find the individual without spiritual moorings or refuge of any kind."

Dr. Tead has no place for either the "completely humanistic and all-out naturalistic interpretations of life,



and of the spiritual values immanent therein." We are, he believes, "actually set in a larger frame of meaning than the purely human and the solely rational." On this basis, he concludes with a statement of his own faith, the essence of which is "... the entire process of living courageously is a natural one, the process as purposively pursued is also divine. The natural self partakes of the divine."

Here is a plea for "... a unifying outlook of knowledge and belief which can enhance meaning, significance, and purpose for humans and at the same time sanctify their earnest and compulsive mundane search for mastery of the natural world within and without the self..." — H.W.C.

*Bees*, their vision, chemical senses, and language, by Karl von Frisch, is a work that is likely to be read for many years to come (Cornell University Press, 1950, 109 pages, illustrated, bibliography, index, \$3.00). It records data as unbelievable as those ascribed to electrons, and better established, for they are subject to direct observation. Some of these standing apiarian mysteries were reported opulently in *Life* recently, and the greatest of them all, the dance language, is there referred to. But shallowness spoiled the story. Von Frisch could himself have been quoted. We do so, stopping, necessarily, at a point. The break-off may happen to annoy the reader. We do it for his own good. Let him read the book. All our theories of animal behavior are challenged by this little volume. The author says (pp. 85-87):

"Twenty-five years ago I thought I understood the language of bees. But further experiments brought many surprises, one of which was the discovery that the round and the wagging dances conveyed information about the distance of the food source rather than about the kind of food. It was another revelation to find that the wagging dance also told the direction of the food source relative to the sun. But the greatest surprise of all has come to light even more recently.

"At one time the outcome of my experiments seemed too fantastic for belief. I wondered whether perhaps the bees of my observation hive had developed into a sort of scientific bee. I decided to see whether the same dances would occur in an ordinary hive. This was clearly so, for I could lift one honeycomb from a typical hive and see the same type of dances still going on, despite the disturbance, as I held the honeycomb in my hands. On one occasion as I was holding such a honeycomb covered with bees I became curious to see what would happen if I held the comb horizontal instead of vertical. The bees continued to dance; yet they could no longer orient their dances relative to gravity, for on a horizontal surface there is no up or down. Now the bees pointed the straight portion of their dances *directly toward the feeding place*. If the honeycomb was slowly rotated like a turntable they kept pointing in the direction of the feeding place, just like a compass needle. To study this phenomenon more carefully I used my observation hive instead of a single honeycomb lifted from an ordinary beehive. But now I laid the observation hive down on its side. This did not seem to disturb the bees, even if the hive was kept horizontal for many days. In the horizontal hive the dances did not change their direction with the position of the sun; they always indicated the direction straight to the feeding place.

"The simplest explanation of this behavior would be to assume that the dancers still indicated the direction to the feeding place in relation to the sun—but in this case directly, and not with reference to gravity. If during the straight portion of the wagging dance a bee kept herself oriented at the same angle to the sun's rays as she had kept in flying out from the hive to the feeding place, then on a horizontal surface she would point her dances directly toward the food (Figure 50). This explanation assumes that the dancing bee can see where the sun stands in the sky. But in my experiments the observation hive was always shaded by a room. Evidently something more complicated was involved."

We suggest also, for the naturalist, a reading of *The Bee's Knees*, Charles D. Stewart, *Atlantic Monthly*, July, 1925, pages 1 to 11, where the question is asked as to evolution of mutually needed parts, those used to collect and those to clean off collected pollen. These related organs must appear together, for either one to be useful. Which came first, the hen or the egg? These questions pile up, and their answers still await a discovery of a common source in the idea, which eventually biology will come to as has physics.

In his September *Leçons sur l'Etre* in 1934, Jacques Maritain promised a series of lectures on *The Philosophy of Nature*. The volume now before us, of that title, is the first of three (Philosophical Library, N. Y., 1951, 182 pp., bibliography, and index). The others are to deal with matter, form, and the living organism. The books will be reviewed as a whole, when available. The present volume is important as condensing the authoritative deliverances of St. Thomas and stating them in today's context. It fortunately includes "Maritain's Philosophy of the Sciences," by Yves R. Simon, as a final chapter. The whole is invaluable because it sets the Catholic position in relation to the new scientific meanings, and in relation thus indirectly (via St. Thomas and Aristotle) with classical European thought. What this is, in essence, will be found on pages 160-163:

"... The general division of theoretical knowledge based upon the consideration of the orders of abstraction is most profoundly objective, since it proceeds from the characteristics of the scientific object as such. Theoretical knowledge is primarily divided into *physics*, *mathematics*, and *metaphysics*.

"This primary division which is the indispensable foundation of all Thomistic speculation about science and philosophy was strangely disregarded by the Thomists of the 19th century. According to the categories set up by Wolff, their metaphysics falls into a general metaphysics, and a special metaphysics itself divided into three disciplines: cosmology, psychology, natural theology (the latter being designated, to make things worse, by the absurd term 'theodicy'). Such a conception upsets radically concepts which play an essential role in the Thomistic synthesis. Considering the philosophy of the world (cosmology) and the philosophy of the soul (psychology) as parts of metaphysics is, from a Thomistic point of view, completely nonsensical; for the whole observable world, including the human soul which is the form of a perishable body, belongs to the order of objects which can neither exist nor be thought of apart from matter.

"Maritain has devoted unflagging effort to the restoration of the concept of philosophy of nature. Badly



discredited in the 19th century by the romantic *Naturphilosophie*, this concept had never been satisfactorily defined, inasmuch as the disciples of Aristotle never succeeded in distinguishing clearly philosophy of nature from positive science. St. Thomas uses promiscuously the expressions *philosophia naturalis*, *scientia naturalis*, *physica*. The problem is whether there is room within the first order of abstraction for more than one approach to the physical world.

"In this connection, the Thomistic tradition includes possibilities of which the Thomists themselves were not sufficiently aware. Each order of abstraction admits of an inner differentiation. The greater commentator of St. Thomas whom Maritain knows so well and loves so dearly, John of St. Thomas, points out with his usual clarity that within one and the same order, various degrees of abstraction determine so many distinct sciences. For instance, within the second order the Thomists distinguish the degree of abstraction proper to geometry and the higher degree proper to arithmetic. Within the third order of abstraction three degrees and correspondingly three sciences are distinguished: logic, metaphysics, theology. John of St. Thomas explains that the abstraction which defines an order is an initial one and consists in the disregarding of some sort of material data: individual matter in physics, sensible matter in mathematics, all matter in metaphysics. Once this initial abstraction is effected, the mind has entered into an order of intelligibility which should not be compared with a bi-dimensional plane but rather with a tri-dimensional space. For within this sphere of intelligibility the mind still enjoys the freedom of moving up and down in such a way as to reach various degrees of terminal abstraction.

"Ancient Scholastics had only vague hints of the inner differentiation of the first order of abstraction. Applying to the first order the principles which had satisfactorily accounted for the inner differentiation of the second and third was to be attempted. Maritain restored and purified the Thomistic concept of philosophy of nature through a mere elaboration of an undeveloped aspect of historical Thomism.

"Every representation concerning the observable world shows a dualistic or bipolar character inasmuch as it refers to an intelligible object expressing itself through a stream of sense appearances, and to a stream of sense appearances stabilized by a center of intelligibility. This bipolar character of the physical object and its representation is clearly suggested by the traditional definition of physics as the science of the *ens mobile seu sensibile*. The physical object is both intelligible (*ens*) and observable (*mobile seu sensibile*). Neither of these opposite characteristics can be disregarded without its specific nature being destroyed. Leave out the words *mobile seu sensibile* and we are no longer dealing with something physical. Leave out the word *ens* and we fall below the level of intellectual knowledge.

"Yet physical thinking, while bound to adhere to the two aspects of its object, can put a particular emphasis on either one. If the emphasis is put on *ens*, we have a form of knowledge both ontological and physical, a philosophical physics, a philosophy of nature. If the emphasis is put on *mobile seu sensibile*, we have a discipline of a physical and non-ontological character, an empiriological science. This point must be insisted upon: the privilege granted to either pole of the phy-

sical object is only a matter of emphasis. The philosopher of nature is not a metaphysician, and his definitions ought to imply some reference to data of sense experience. On the other hand the empiriologist is not a mere dealer in sense experiences, for the observable regularities with which he deals owe their constancy and their consistency to their being organized by some *ratio entis*."

An expression of gratitude is in order to George L. Trager, Director of Linguistic Research of the Foreign Service Institute of the Department of State, who has brought his reprints of the Collected Papers on Metalinguistics of the late B. L. Whorf up to date of September 2, 1952. Whorf's *Language, Mind, and Reality* is reprinted from *The Theosophist* (Adyar, Madras, India, January and April, 1942) in Spring, 1952 issue of ETC, along with a bibliography of the writings of this original and penetrating mind. In his later years Whorf considered the attitude of Panini, the classical codifier of Sanskrit, and frequently pointed out that the Hindu view of the essential nature of language anticipates what is now called metalinguistics. It would be a real contribution to world welfare if qualified Indian scholars would present us with studies of Panini done from this, and not the formal grammarian, point of view.

The attention of our readers is directed to an admirable series of Penguin Books entitled *Science News*, paper bound, illustrated volumes, about 125 pages, 4 $\frac{2}{3}$ " x 7 $\frac{1}{8}$ ", sold at 50c each in the U.S.A. The editor is A. W. Haslett, and his contributors are scientific workers, many of them celebrated. The articles are most helpful in bringing the reader up to date on major topics, eight to ten in each of the quarterly issues. Twenty-five volumes have been issued in the last six years. The low cost, and the high dependability, and readability, make this series most useful.

#### *Books Received for Review*

- Studies in Logic and Probability*, by George Boole, Open Court Publishing Co., La Salle, Ill., 1952.
- Evolution in Action*, by Julian Huxley, Harper and Bros., New York, 1953.
- The Primitive City of Timbuctoo*, by Horace Miner, Princeton University Press, Princeton, N. J., 1953.
- It Takes Time*, by Marie I. Rasey, Harper and Bros., New York, 1953.
- Of God, the Devil, and the Jews*, by Dagobert D. Runes, Philosophical Library, New York, 1952.
- Spinoza Dictionary*, edited by Dagobert D. Runes, Philosophical Library, 1951.
- Geometry and the Imagination*, by David Hilbert and S. Cohn-Vossen, Chelsea Publishing Co., New York, 1952.
- Vers une Sociologie Nouvelle*, by Michel Rimet, published by the author, Paris, 1952.
- Scientific Explanation, a study of the function of theory, probability and law in science*, by Richard Bevan Braithwaite, Cambridge University Press, London, 1953.
- Biology and Language*, by J. H. Woodger, Cambridge University Press, London, 1952.
- Improving Transition from School to College*, edited by Arthur E. Traxler and Agatha Townsend, Harper and Bros., New York, 1953.

## 1953 SUMMER WORKSHOP AT UNIVERSITY OF MAINE

A summer workshop, co-sponsored by the University of Maine and the Foundation for Integrated Education, will be conducted on the University campus at Orono (near Bangor), Maine, from the evening of June 28th to July 2nd, noon.

### *The Theme*

The central theme will be the nature of creativity in science, and its significance for the cultural linking of the sciences with the humanities.

Since the workshop theme is obviously of major importance to others besides teachers and educational administrators, registration will be open to laymen. The conference topic has immediate bearing on the contemporary world scene and on the historical background of that scene.

It is now abundantly clear to teachers that, if we are to assemble meaningful knowledge, we must first establish a valid method. Then it is necessary to reassess important landmarks in learning in terms of that method, so as to restore proportion, values, and credit to education. It is clear to laymen that world settlement is not achieved by the imposition of the ideas of one society on the world, nor by an attempt to solve physical problems without reference to philosophy. A common understanding of nature, of man and his place in nature is called for, and this in turn depends on a valid method of arriving at such insight.

Particular emphasis will be put on the role played by deductive method in increasing the power of science during the last eighty years, and on the singular meaning of these developments to psychology, personal and social.

By creativity in science is meant the ability of man, as a self-conscious being, to originate assumptions and then to devise rational systems, thus arriving at internally logical and increasingly simple and elegant structures of thought. These structures, of course, acquire realistic meaning in science only from empirical validation. The 20th century has seen the increasing significance of deductive-exact structures in science, following the 19th century preponderance of work in the preliminary inductive and correlational phase of science. These deductively formulated structures call increasingly upon creativity and constitute orders of experience not unlike those expressed through the arts and in living.

As in the six previous summer workshops of the Foundation, continuity will be provided by regular sessions each morning and evening. Afternoons will be allotted to voluntary sub-group discussions, and to recreation. The region is one of much beauty and interest, and families will find opportunity to enjoy it.

Under the general supervision of Professor Charles Virtue, Department of Philosophy, Uni-

versity of Maine, and Mr. F. L. Kunz, Foundation for Integrated Education, the theme of the conference is being planned to expand systematically, as outlined below.

As each day is allocated to a topic of broad import, there will be a chairman for each of these occasions, customarily the first speaker in the morning. The experienced guidance of Dean Mark R. Shibles, the School of Education, University of Maine, as well as that of scheduled speakers, will be afforded to us on matters educational.

As is customary in the Foundation Workshop planning, some time is being reserved. Effort will be made, beyond carrying through the schedule below, to provide also some flexibility needed to make use of resourceful participants who will be found in the final registration list.

### *The Schedule*

A firm outline of the broad considerations will be provided in the opening address on "Creativity in Science and Other Fields," by Professor P. A. Sorokin (Harvard). He will discuss the total process of creativity and the specific role which the supraconscious intuition and deductive and inductive thought play in it. Opportunity is provided the following afternoon for continuing informal discussion with Professor Sorokin.

The precise method which gives secure anchorage for the entire program will be developed by Professor R. B. Lindsay, chairman of the Department of Physics, Brown University, on June 29th, in the first of the morning study and discussion sessions on "Contemporary Deductive-Exact Science, its Accomplishment in Modern Physics and its Significance for Integration." Professor Lindsay will continue as chairman throughout that day, which will be devoted to the natural sciences.

The second morning session of this day will be on "The Place of Mathematics and Logic in the Current Transition Toward Creativity in Science."

In the evening of the 29th, the address will be on "Biology: Genetics and Morphology, a Contrast of Triumph and Defeat," by Professor Clarence Cook Little, Roscoe B. Jackson Memorial Laboratory.

Tuesday, June 30th, has been allocated to an examination of the significance of the preceding discussion to aspects of human psychology, and in particular to the affective and active aspects of man's nature, to the arts, to language, and communications generally.

Here important contributions will be made by Professor Peter A. Bertocci, Boston University, Professor Norman L. Munn, Bowdoin College, and Professors Cecil J. Reynolds and Charles F. Virtue, of the University of Maine.

Wednesday, July 1st, is assigned to practical questions which arise from the new situation. It

is evident that research is called for, that teacher education and high school programs will be changed as the new circumstances become clearer, and that adult education can be greatly and immediately enriched. These questions will be discussed by Professor Robert Ulich, Harvard, and Herbert Espy, Commissioner of Education of the State of Maine.

At the special request of members of the Foundation Council, Wednesday evening will be devoted to an examination of "The Role of India in the Meeting of East and West."

Final sessions will return the thought of the group to sociology and global problems. Professor John Q. Stewart, Princeton, will examine the deductive approach to social physics on Thursday morning July 2.

The proceedings will be recorded with a view to publication.

#### *Registration*

A limit has necessarily to be placed upon registration. This will be determined by the quarters assigned by the University, and by the need to keep the number within manageable limits for

purposes of discussion.

An effort will be made to accommodate laymen whose professions make the conference of special interest.

The fee for the entire program is \$35 and there is no additional registration or incidental charge. To permit of family residence, the maintenance charge (room and meals) for a wife or child is fixed at \$30.

Reservations, by mail, may be addressed up to June 24th to the Foundation for Integrated Education, 246 East 46th Street, New York 17, N. Y. (Telephone: MUrray Hill 2-5672). After that and up to June 27th to Kenneth Fobes, Administrative Secretary, School of Education, University of Maine, Orono (Tel. Ex. 295).

Registrations should be accompanied by a deposit of \$10 per person.

Arrivals, registration, and room assignment will be from 1 p.m. onward, Sunday, June 28th, in West Hall, University of Maine, Orono, followed by dinner at 6 p.m. (informal) in the dining room assigned to the Workshop. The program will begin at 7:30 p.m.

## NEWS AND NOTES

Attention of readers generally, and librarians in particular, is directed to the fact that this is number *five* of volume nine of *MAIN CURRENTS*. Hitherto, four numbers issued quarterly have constituted a volume. Now that we issue the journal every two months of the school year, it seems suitable to give more adequate coverage by appearing throughout the season, namely in September, November, January, March and May. Postoffice re-entry has accordingly been made and subscribers will next receive number one of volume ten in September.

Our relations with our associates and subscribers to *MAIN CURRENTS* are not coldly financial. Therefore the reader will note that the volume and issue number of his renewal is not altered by the new arrangement.

Plans for volume ten of *MAIN CURRENTS* include the publishing of articles and statements from a large number of persons well known in education. Attention will be focussed especially on significant developments and integrating concepts which have arisen in particular disciplines during the last 50 years but which have wider implications both for other fields and general thought.

Analyses will be made of current problems in science and education. Discussion will particularly deal with such basic questions as: the development of methodology and the structuring of the various sciences, especially the biological and social sciences; problems of reductionism and the applicability of concepts and techniques from certain fields in other areas. Attention will also be given to such topics as data which do not fit into existing

theories, and possible directions of fruitful research in the future.

These topics, although to be treated by specialists, will be written in terms which the general reader can comprehend, and will stress implications for the main currents of thought.

Reports from colleges and universities over the country show an increasing number of experiments in integrative programs. Plans are being made to include in each issue of the coming volume descriptions of the most interesting of these experiments, including analyses of the problems involved and evaluations of the success of the programs by those who participated in them.

A convocation and faculty conference at Wisconsin State College in Milwaukee recently offered an unusual opportunity to discuss the central interests of the Foundation for Integrated Education with a diversity of teachers. The tour came to include other addresses and a number of conversations in several cities. Brief notes on some points may be of interest.

State College in Milwaukee is one of the 5 state colleges in Wisconsin where *MAIN CURRENTS* and other Foundation publications are read. The faculty has been deeply concerned in recent years with the problems for which divided collateral courses in general education are no solution. The questions posed in the faculty meeting came therefore out of minds sharply focused on vital points. The whole faculty seems to be concerned in varying degrees, and hence the special force of thought



was felt from physical science, psychology, sociology, and every major field. It was possible to make considerable progress in a single faculty conference, and a preceding convocation address. If it is fair to judge from this occasion, teacher education in Wisconsin is undergoing a considerable overhaul in which the major theses of the Foundation have a proper part.

A second item consisted of profitable visits with men active in mathematical biological studies. The need to solve the refractory problems of morphogenesis is now widely known. Leading groups and many individuals are at work. Around Professor N. Rashevsky (University of Chicago) is the Committee on Mathematical and Deductive Biology. Professor Ludwig von Bertalanffy and others are developing general system theory. There must be a large number of groups large and small, as well as individual workers attempting to get some purchase on this central problem in the middle of biology. The recent spate of books on form and symmetry testifies to this.

On the recent tour it appeared that various contributory new measures are shaping. One of our correspondents is collecting papers on the mathematics of nature, on mathematical logic, and on scientific method generally, as it has been more recently developed. Through his efforts, papers by Whitehead, by the Polish school, and others may now be made available. Another senior biologist is preparing to give months merely to informal daily conversations with mathematicians, so as to interest them in applying their thinking to the unwieldly mass of information with which the biologist feels overloaded. One man, in a key position, remarked that a score of leading biologists have recently independently spoken of the need to stand back from the mass of data to see whether some pure mathematical-logical treatment would not suggest itself. This is commonly seen in the development of a science when it becomes choked with facts.

The tour provided opportunity to discuss the relation of the Foundation's adult education courses to extant activity, generally called study of the Great Books. The Adult Education Department of the Cleveland Public Library has discovered a very lively interest in the great books of the East, which are scarcely noticed in such courses of classics of literature. But other questions of equal import have arisen in several cities: How is the adult education student to know what is now thought on the present frontier of knowledge, and how is he to relate the thought of Plato to that of (say) Einstein? Is the individual expected to rest content with mere acquaintance with great books, and to have no opportunity to grasp the essential methods of knowing? What is to be done with the affective and active aspects of human life, even if the logical-scientific body of learning is reviewed?

The Midwest tour under notice coincided with the meetings of the Higher Education Division of the N.E.A. The organization of this large gathering is skillfully managed, and the devoted work of the sub-groups is admirable. The whole range of problems in higher and adult education is surveyed. Nevertheless one inclines to wonder whether it is not time to apply some principles of synthesis to this leading gathering of the nation's teachers? Just as the American Association for the Advancement of Science has started a transition from specialization — which it can leave to the professional societies — to the achievement of basic understandings, has not the time come for the N.E.A. to seek integrative methods through its Higher Education meetings? F.L.K.

In addition to the full year courses given in New York University (for the second time) and in Philadelphia, which the Foundation for Integrated Education has been conducting during the past academic year, the Foundation has, as previously announced, co-sponsored a three-lecture series with the Staten Island Museum of Arts and Sciences and a six-lecture series at the Cold Spring Project of the Walt Foundation. Both students and lecturers have expressed enthusiasm about these series.

Negotiations are proceeding for another short series in Staten Island and for another full year course in Philadelphia. Inquiries have also been received from several other cities, and the Foundation is working with key people in those areas.

Harvey W. Culp, Executive Officer of the Foundation for Integrated Education, will sail for Europe in late May. He will spend two weeks in the British Isles discussing integrated education with faculty members of a large number of colleges and universities, following up the discussions pursued by President Kirtley F. Mather originally at the Conference on "The Vocation of the University Teacher" held in Swanwick, England, in March, 1952. Mr. Culp will then consult with officers of Unesco in Paris at their invitation, exploring the possibilities of an international conference on integrated education as the 1954 program of the "Rencontres Internationales de Geneve" in Geneva. Interest has been expressed in the Foundation's program since the 1952 Unesco seminar, which was devoted to a discussion on "L'Homme en Face de la Science."

Following his Paris visit, Mr. Culp will stop in Bonn and will briefly join Professor Henry Margenau in Heidelberg. He will then visit Innsbruck, Austria, and make several visits with Foundation correspondents in Italy.

In Vol. 9, No. 4 of MAIN CURRENTS, pages 123-125, the name of Dr. Alexander F. Stern was inadvertently omitted as author of the article, "Space, Field, and Ether in Contemporary Physics," reprinted from *Science*.

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